



# **United Launch Alliance**

**Launch Services Including:  
Commercial Crew  
EELV Performance  
Orbital Demonstration**

**March 2010**



# United Launch Alliance (ULA)

- ❑ Two World-Class Launch Systems
  - 50/50 Joint Boeing/Lockheed Martin Ownership
- ❑ Strengthen Mission Success

## *Medium Class*



**Delta II**

## *Intermediate Class*



**Delta IV**



**Atlas V**

## *Heavy Class*



**Delta IV Heavy**

# 100% Mission Success

## ULA Launch History

**NROL-21 - 12/14/06 - Delta II**  
**THEMIS - 2/17/07 - Delta II**  
**STP-1 - 3/8/07 - Atlas V**  
**COSMO-1 - 6/7/07 - Delta II**  
**NROL-30 - 6/15/07 - Atlas V**  
**Phoenix - 8/4/07 - Delta II**  
**Worldview-1 - 9/18/07 - Delta II**  
**Dawn - 9/27/07 - Delta II**  
**WGS-1 - 10/10/07 - Atlas V**  
**GPS IIR-17 - 10/17/07 - Delta II**  
**DSP-23 - 11/10/07 - Delta IV**  
**COSMO-2 - 12/8/07 - Delta II**  
**NROL-24 - 12/10/07 - Atlas V**  
**GPS IIR-18 - 12/20/07 - Delta II**  
**NROL-28 - 3/13/08 - Atlas V**  
**GPS IIR-19 - 3/15/08 - Delta II**  
**ICO G1 - 4/14/08 - Atlas V**  
**GLAST - 6/11/08 - Delta II**  
**OSTM - 6/20/08 - Delta II**  
**GeoEye - 9/6/08 - Delta II**

**COSMO-3 - 10/24/08 - Delta II**  
**NROL-26 - 1/17/09 - Delta IV**  
**NOAA-N' - 2/6/09 - Delta II**  
**Kepler - 3/6/09 - Delta II**  
**GPS IIR-20 - 3/24/09 - Delta II**  
**WGS-2 - 4/3/09 - Atlas V**  
**STSS-ATRR - 5/5/09 - Delta II**  
**LRO/LCROSS - 6/18/09 - Atlas V**  
**GOES-O - 6/27/09 - Delta IV**  
**GPS IIR-21 - 8/17/09 - Delta II**  
**PAN - 9/8/09 - Atlas V**  
**STSS Demo - 9/25/09 - Delta II**  
**Worldview-2 - 10/8/09 - Delta II**  
**DMSP-18 - 10/18/09 - Atlas V**  
**Intelsat-14 - 11/23/09 - Atlas V**  
**WGS-3 - 12/5/09 - Delta IV**  
**WISE - 12/14/2009 - Delta II**  
**SDO - 2/11/2010 - Atlas V**  
**GOES-P 3/4/10 - Delta IV**

**National Security - 18**

**NASA/Civil - 11**

**Commercial - 9**

## Most Recent Launches



**Atlas V**  
**SDO**  
**2/11/10**



**Delta II**  
**WISE**  
**12/14/09**

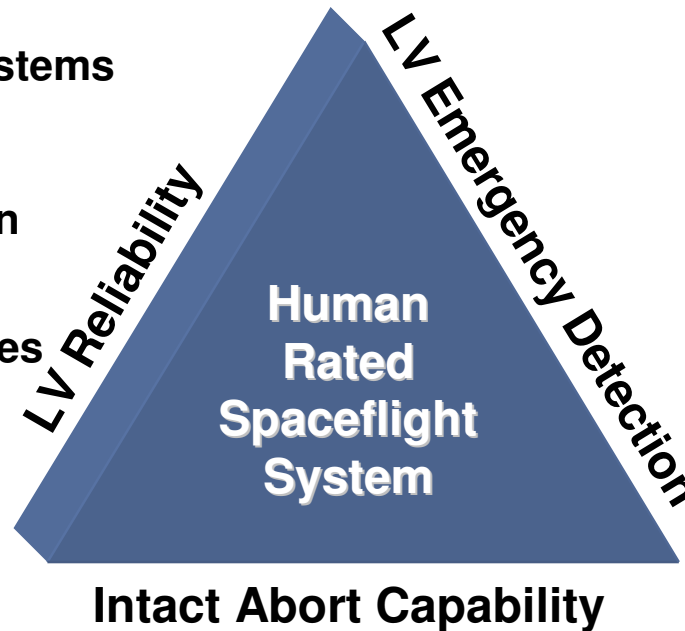


**Delta IV**  
**GOES-P**  
**3/4/10**

# System-Level Human Rating

## Reliability

- Demonstrated reliability
- Experienced people & proven management systems
- Single fault-tolerant systems
- Robust vehicle design
- Vehicle characterization
- Rigorous, closed-loop test-as-you fly processes



## Emergency Detection

- Monitor critical systems using independent fault-tolerant failure sensing system
- Abort commands
- Fly instrumentation on all missions
- Already know our envts & in-family characteristics for developing EDS

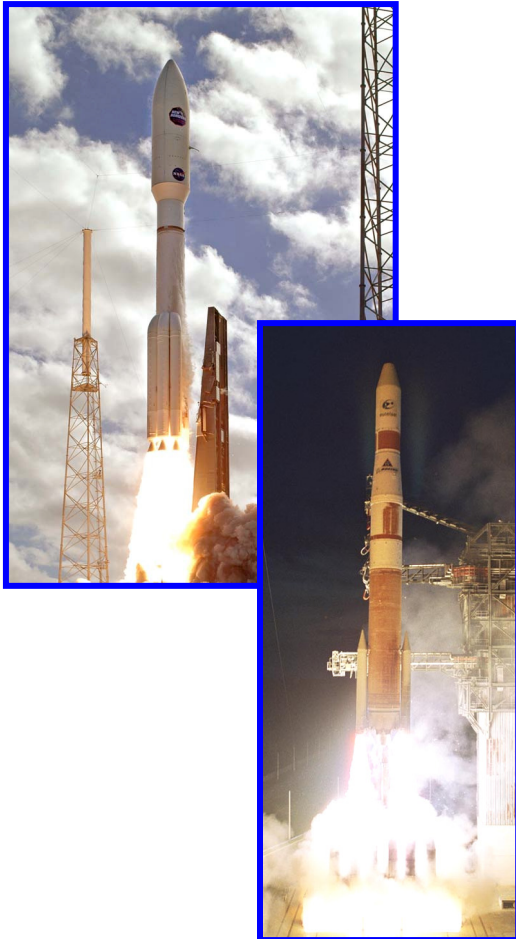
## Intact Abort Capability

- Catastrophic LV failures minimized
- Benign abort envts.
- Black zones eliminated

***Common Sense System-Level Approach***



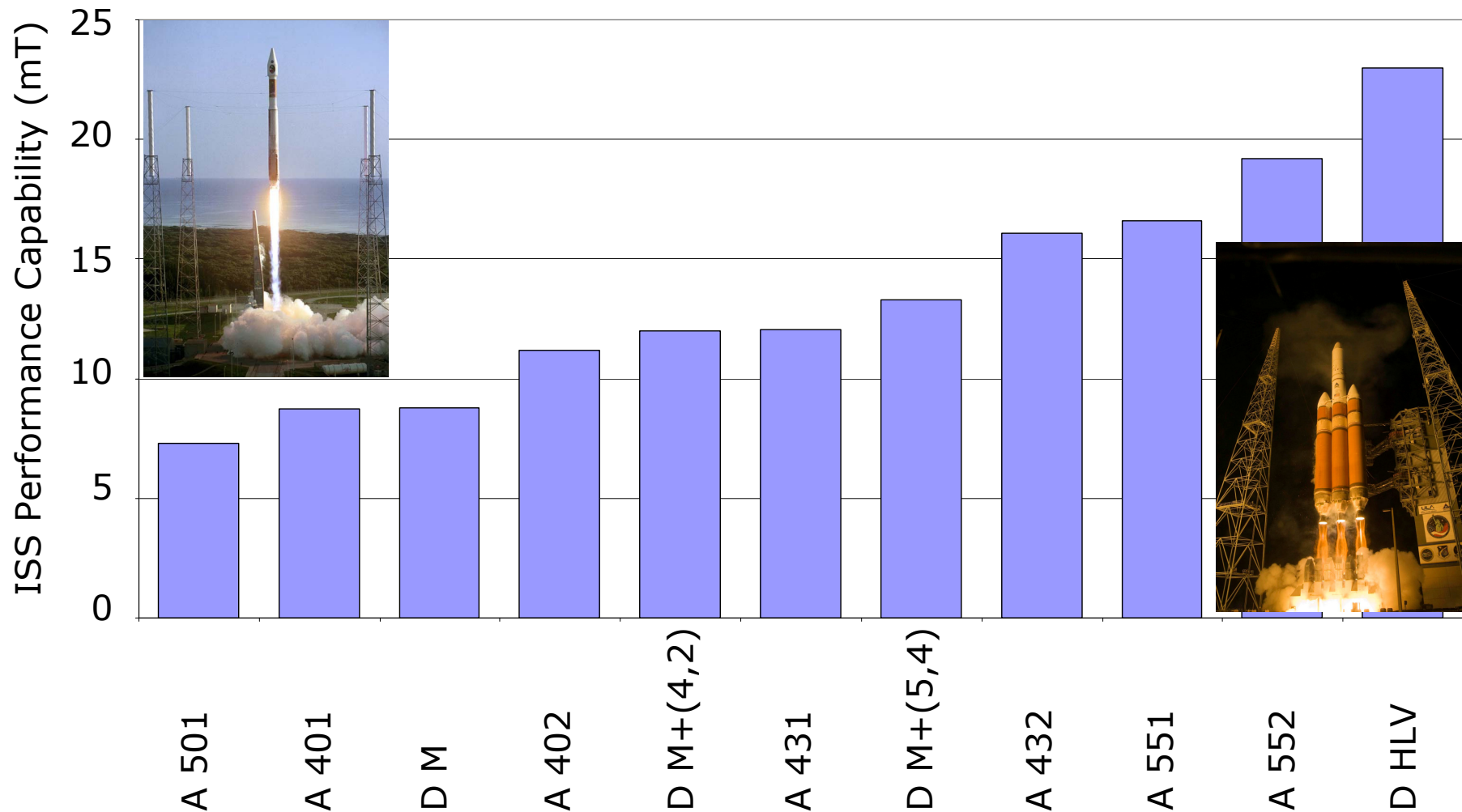
# ULA CCdev (Commercial Crew)



- ❑ Comprehensive maturation plan for commercial crew launch vehicles
  - Includes addition of modular Emergency Detection System (EDS)
  - Supports Atlas V, Delta IV, other LVs
- ❑ ULA CCDev baseline tasks:
  - EDS definition
  - Identify LV failure modes and how measured
  - Algorithm development, software coding, validation
  - Crew interface design
  - Prototype EDS testing and demonstration
  - Real-time monitoring demonstration
- ❑ NASA investment \$6.7M

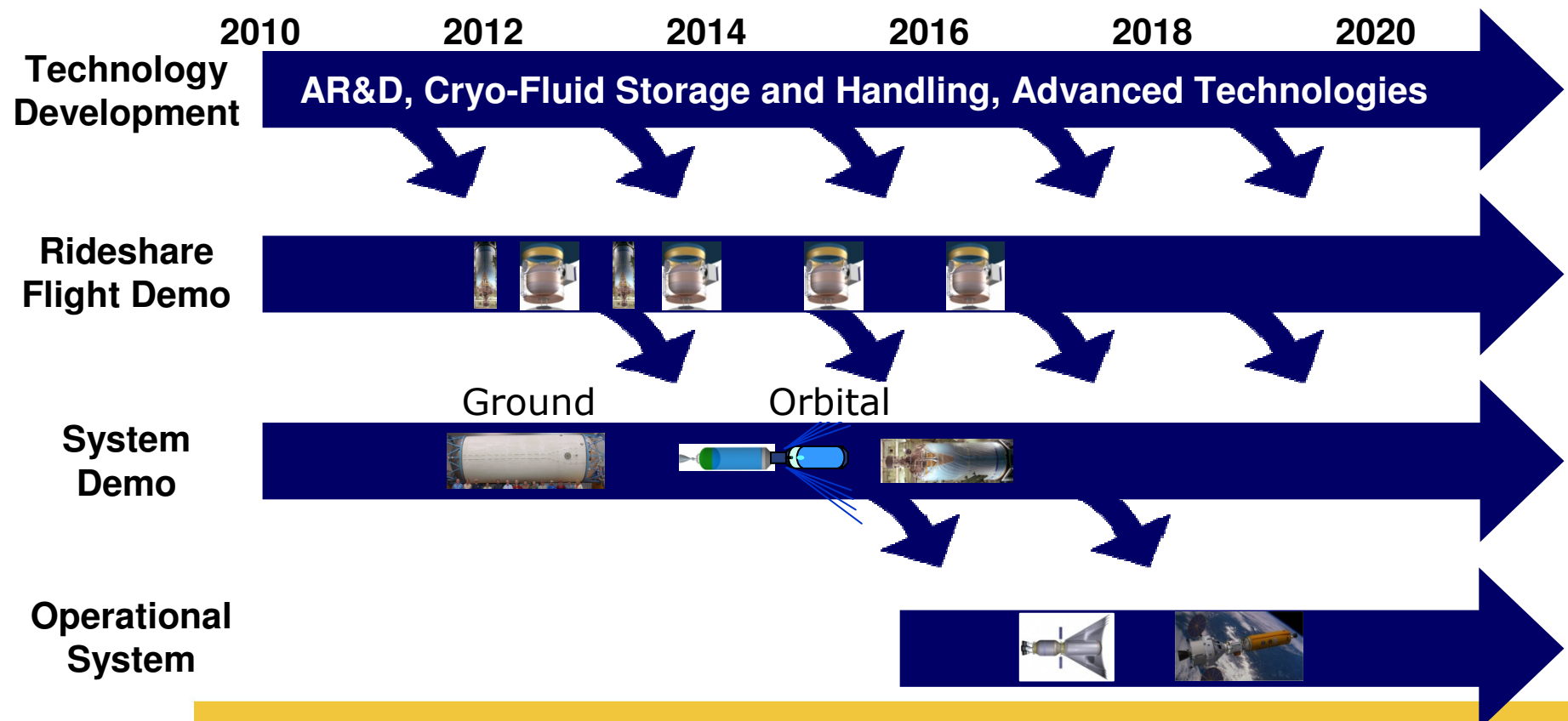
# EELV ISS Performance

- EELV supports wide range of customer requirements



# Orbital Demonstrations

- EELV can support NASA's development of orbital capabilities
  - Rideshare through dedicated launches provide affordable near term demonstrations

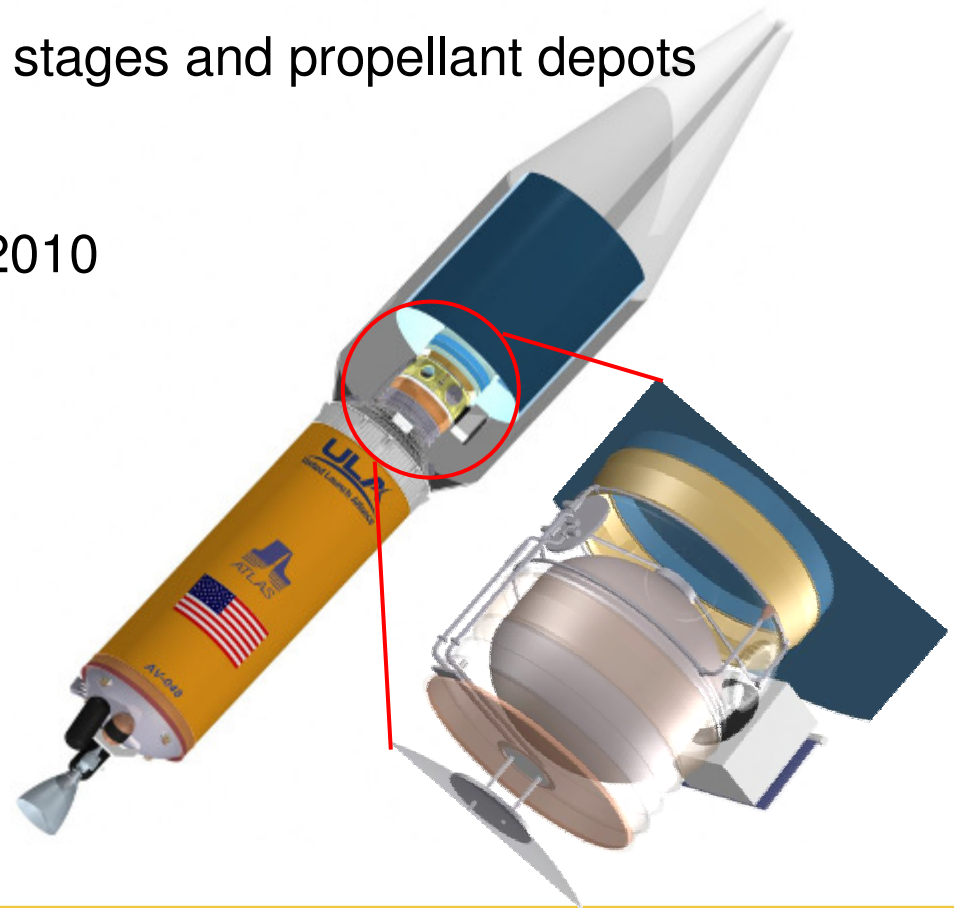


# CRYogenic Orbital TEstbed - CRYOTE

- ❑ Orbiting laboratory investigating cryogenic fluid management
  - Helps bridge TRL valley of death by providing relevant environment
  - Affordable –EELV rideshare
  - Supports long duration cryogenic stages and propellant depots
- ❑ First Flight as early as 2012
  - Ground demonstration Summer 2010



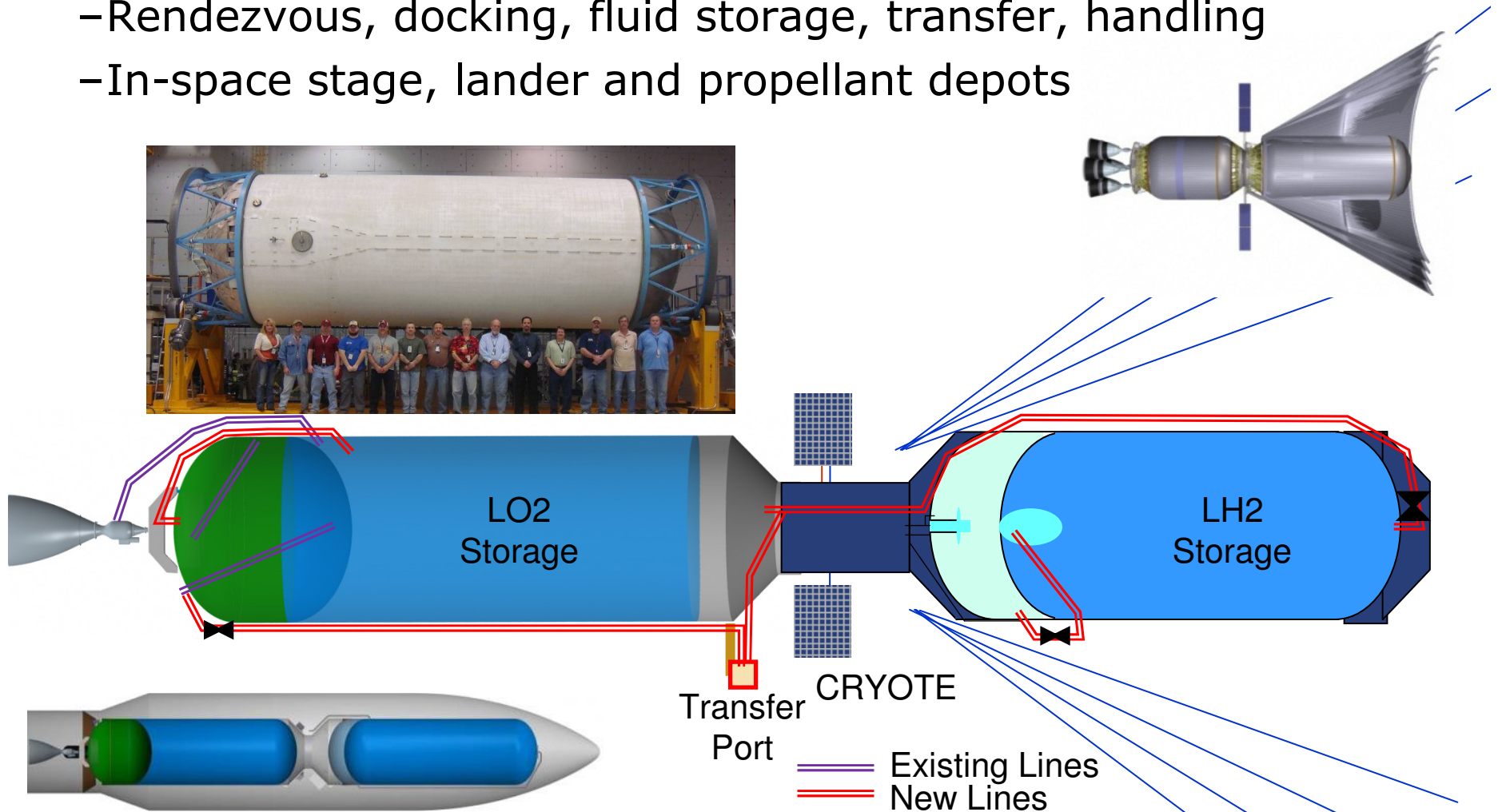
ground test unit





# Orbital System Demonstration

- ❑ Integrated end to end system test
  - Rendezvous, docking, fluid storage, transfer, handling
  - In-space stage, lander and propellant depots



# Summary

- ❑ ULA is pleased to be supporting NASA's commercial crew program
- ❑ EELV's provide reliable launch services
  - Broad performance capability
- ❑ Frequent EELV launches provide opportunity for orbital demonstrations
  - Rideshare such as CRYOTE
  - System level orbital demonstration

